

5. BENEFITS

5.1. Overview

This chapter focuses on the health, safety and economic benefits of pedestrian accessibility, and provides information on the cost-benefit analyses reported in other studies. Background data on walking to school is provided primarily to inform discussions of this topic; the benefits of improving kids' journey to school are addressed under the topics of health and safety.

The 2011 report *Making the Case for Investment in the Walking Environment: A review of the evidence* is a compilation of some of the best academic research and real-world case studies on the many and far-reaching benefits of improving conditions for pedestrians. (Sinnott, 2011) It summarizes cost-benefit findings from several reports, examining a range of possible benefits, including:

- Reduced road collisions
- Reduced congestion, fuel and other costs
- Reduced noise and air pollution
- Reduced carbon dioxide emissions
- Health benefits from a more physically active population
- Greater accessibility to facilities and services
- Increased social capital
- Increased economic activity
- Reduced public costs of providing transport infrastructure and services

This report draws several important conclusions, including:

- Investments in the walking environment are **good value for money** – even accounting for the fact that most **evaluations only consider a small number of potential benefits**. Cost-benefit analyses are underestimating the value of the walking environment, because very few studies have accounted for the impacts of increased walking on road casualties, congestion, fuel costs and other motorized travel costs, noise and air pollution, carbon dioxide and reduced public costs of providing for motorized transport. There are likely to be substantial benefits arising in these areas where investment in walking leads to modal shift.
- The most **significant measured benefit of investments in the walking environment is better health from increased physical activity**, and again, this is despite the fact that the only part of the total health benefit has been assessed.

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- **User experience (often referred to as journey ambience) is the second largest benefit.** This represents the improved travel experience of users of a walking environment
- **All the evidence reviewed of evaluations of walking environments showed positive cost-benefit ratios, of up to 37.6 (Sinnott, 2011)[emphasis in original]**

5.1.1 Health Benefits

Walking is good exercise. The US Centers for Disease Control and Prevention (CDC) recommends that adults engage in 150 minutes a week of moderate-intensity aerobic activity, such as brisk walking. (Centers for Disease Control)

Numerous studies have assessed the health benefits of walking. As reported in *The New York Times Magazine*:

A recent meta-analysis of studies about exercise and mortality showed that, in general, a sedentary person's risk of dying prematurely from any cause plummeted by nearly 20 percent if he or she began brisk walking (or the equivalent) for 30 minutes five times a week. (Reynolds, 2011)

In recent years, researchers have focused on the links between land use patterns that rely on automobile transportation, decreased rates of physical activity and increased rates of obesity and heart disease. For example, a 2002 article in the *American Journal of Preventive Medicine* found that "Residents of homes built before 1974 in urban or suburban areas were more likely than residents of newer homes to walk ≥ 20 times per month." (Berrigan & Troiano, 2002). This research used the construction year of 1974 as a proxy for neighborhood design. The paper states: "Neighborhoods containing older homes in urban areas are more likely to have sidewalks, have denser interconnected networks of streets, and often display a mix of business and residential uses."

A 2004 article in the *Journal of Planning Literature* makes the case, based on a review of 20 public health studies, that there is a link between the way neighborhoods and streets are built and health outcomes. This article concludes:

During the past several decades, the lack of sufficient coordination between land use and transportation planning and the limited public expenditures in nonmotorized facilities - less than 2 percent of total federal transportation budgets are allocated for pedestrian and bicycle facilities and programs (FHWA 2002) - have contributed to creating urban environments where walking and biking are marginalized or disregarded as transportation modes. The studies' findings imply that, to enhance the health and well-being of the population, infrastructure for walking and biking needs to become an integral part of public transportation systems and services. (Lee & Moudon, 2004)

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A good deal of recent research has focused specifically on the health benefits for children who walk to school. Encouraging kids to walk to school has become an increasingly high priority for public health officials who are concerned about an increase in childhood obesity. In 2009, the National Centers for Disease Control reported that:

Walking to and from school has been demonstrated to increase physical activity among children during the commute, leading to increased energy expenditure and potentially to reduced obesity. However, the percentage of students walking to school has dropped dramatically over the past 40 years, partially due to the increased distance between children's homes and schools. (Centers for Disease Control, 2009)

The CDC's top recommendation, as presented in this report, is to site schools in neighborhoods rather than on the community's edge, in order to eliminate a key deterrent to walking: distance. In most places in the Study Area, reconsidering school siting would provide a very long-term solution, since new communities and new schools are not being built. Locally, the emphasis is on improving routes to school. (See "Journey to School", below, for more information on walking to school.)

5.1.2 Safety Benefits

There were 960 vehicle collisions with pedestrians in the Study Area in the four-year period from January 2008 to December 2011. A pedestrian was killed in 20 of these collisions. As seen in Table 4.1, nearly 70 percent of these collisions were in the City of Syracuse. The Towns of Clay, Cicero, Salina and DeWitt each had at least 30 pedestrian-vehicle collisions in this period.

According to the FHWA's "Toolbox of Countermeasures and their Potential Effectiveness for Pedestrian Crashes," building sidewalks in order to get pedestrians out of the roadway can reduce the incidence of car-pedestrian collisions by 88 percent (Federal Highway Administration, 2008). Based on this rating system, the only type of project that is more effective in making a facility safe for pedestrians is the construction of a pedestrian overcrossing or underpass.

Pedestrian safety is important for all roadway users, but particularly so for populations that have limitations in their ability to use motorized vehicles, such as children, disabled populations and the elderly. According to the report *Aging Americans: Stranded without Options*, older pedestrians are more vulnerable to injury than younger people: "Older people are among the first to suffer increased injuries and fatalities when streets and highways are not safe." (Bailey, 2004)



Source: www.pedbikeimages.org/
Photo by Dan Burden

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Table 5.1 –Vehicle-Pedestrian Collisions in the Study Area, January 1, 2008 to December 31, 2011

Municipality	Total Number	Percent
City of Syracuse	655	68%
Town of Cicero	42	4%
Town of Clay	37	4%
Town of Salina	34	4%
Town of DeWitt	30	3%
Town of Manlius	23	2%
Town of Camillus	17	2%
Town of Geddes	15	2%
Town of Onondaga	13	1%
Village of Baldwinsville	12	1%
Village of North Syracuse	12	1%
Village of Solvay	11	1%
Town of Skaneateles	8	1%
Town of Lysander	6	1%
Village of East Syracuse	6	1%
Village of Liverpool	5	1%
Village of Minoa	5	1%
Onondaga Indian Reservation	4	0.4%
Village of Central Square	4	0.4%
Town of LaFayette	3	0.3%
Town of Pompey	3	0.3%
Village of Fayetteville	3	0.3%
Town of Elbridge	2	0.2%
Town of Hastings	2	0.2%
Town of Tully	2	0.2%
Town of Van Buren	2	0.2%
Village of Phoenix	2	0.2%
Town of Marcellus	1	0.1%
Town of West Monroe	1	0.1%
TOTAL	960	100%

Source: Accident Location Information System data

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There are many resources available on the safety benefits of sidewalks and designing roadways and pedestrian facilities to improve pedestrian safety. See the links provided in the “More Information” section below for more information on how to assess roads for pedestrian safety and how to plan and design roadways for greater safety.

5.1.3 Journey to School

When the route that children would use to walk or bike to school is perceived as too dangerous, the most immediate solution is to use school buses and family vehicles to get students between home and school. But the health benefits of walking and biking, and the safety benefits associated with improved facilities, argue for investments in improved facilities.

A recent analysis of the benefits of walking to school states: “Studies show that children who walk and bicycle to school are more physically active, have lower body mass index scores, lower obesity levels and are more likely to meet physical activity guidelines than students who are driven or bused to school.” (Safe Routes to School National Partnership, 2012)

This source also states that the direct costs of treating childhood obesity nationally are as high as \$14 billion annually.



Source: www.pedbikeimages.org/
Photo by Dan Burden

More research is needed locally to determine the possible cost savings and safety benefits that could be realized through improvements to pedestrian access to school.

Background Information

According to a survey conducted by the National Center for Safe Routes to School, more than three-quarters of elementary and middle-school children in the United States take either a family car (45 percent) or a bus (37 percent) to get to school. Eleven percent walk to school (the survey did not specify whether or not children were walking alone, with an adult or in a group). The trip home from school has slightly different percentages: 35 percent of students take a family car, 42 percent ride a bus and 15 percent walk. (National Center for Safe Routes to School, 2010) This survey also asked parents why they do or do not allow their children to walk or bike to school. The six issues most frequently cited by parents were:

- Distance, 62%
- Traffic speed, 55%
- Traffic volume along the route, 55%
- Intersection and crossing safety, 48%

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- Weather, 44%
- Crime and violence, 38%

According to this survey's results, 41 percent of students who live within a quarter-mile of their school walk to school. This proportion drops to 18 percent for students who live between a quarter-mile and a half-mile from their school, and to 9 percent for students who live between a half-mile and a mile from school. Two percent of students who live more than a mile from school walk. (National Center for Safe Routes to School, 2010)

While sidewalks cannot alter the weather or make a two-mile walk to school substantially shorter, good planning and design can reduce the risks that parents perceive in letting their children walk next to and across high-speed, high-traffic roadways.

Busing Costs

Beyond health implications, adding sidewalks to make routes to school safer can save school districts (and taxpayers) money by reducing transportation costs. According to a report from the Citizens Budget Commission, "School districts in New York spent \$1,100 per pupil on average on transportation in 2010, more than any other state and 140 percent above the U.S. average of \$459." (Citizens Budget Commission, 2012)

New York State Education Law Section 3635 provides the framework for how school districts provide transportation to and from school. The law requires Boards of Education of non-city school districts to provide transportation for all eligible resident pupils in grades K-8 who live more than two miles from school, and for pupils in grades 9-12 who live more than three miles from school, up to a distance of 15 miles. (New York State Department of Education, 2009) School districts are then reimbursed for up to 90 percent of the cost of busing students who live within the mandated busing radii.

Child Safety Zones

Section 3635-b of the Education Law allows Boards of Education to identify "Child Safety Zones" within the radii specified above. These safety zones are based on whether or not students must traverse a known hazardous area in order to reach their school.

The guidelines for establishing these zones provide a scoring system for the hazards that students must traverse while walking to school (New York State Department of Education, 2009). Three types of hazard are identified: highways without sidewalks or with inadequate shoulders, highway intersections and highway-railroad grade crossings. Points are assigned depending on several variables; for a roadway with narrow shoulders, factors include the length of the roadway, the speed limit and traffic volume. Depending on the score and the type of school, specific routes or areas can be classified as Child Safety Zones. The school district then becomes eligible for state funding for busing the student or students who would otherwise be forced to walk or bike through these zones, even if these students are

within the radii specified under State law. There is not a single, comprehensive data source on which school districts use this mechanism to fund supplemental bus services, so it is not known how extensively Child Safety Zones are utilized locally.

One of the elements considered in this evaluation is the presence or absence of sidewalks and adequate (five-foot-wide) shoulders. For example, a half-mile long stretch of road with a 45 MPH speed limit, without sidewalks or adequate shoulders and with moderate traffic volumes (50 vehicles in a 15-minute period) would likely be eligible to be a Child Safety Zone, if used by students getting to a K-8 school.

Adding sidewalks to this portion of the road during a road reconstruction project could have the effect of dramatically improving safety and reducing a hazard, making it possible for more students to walk to school.

Safe Routes to School

Between 2005 and 2012, the US Department of Transportation provided over a billion dollars to state departments of transportation through the National Safe Routes to School program to improve safety on walking and bicycling routes to schools. With the approval of a new transportation bill, Moving Ahead for Progress in the 21st Century (MAP-21) in July 2012, Safe Routes to School ceased to have a dedicated share of the national transportation budget and has become one of the types of project funded by a new category, known as Transportation Alternatives Programs (TAP) (see [Chapter 6, Sidewalk Finances](#)).

Cost-Benefit Analyses

Improved air quality, better health and safer streets are goals in and of themselves, but each of these has a quantifiable financial aspect as well. For example, health benefits may be seen in fewer sick days, number of hospitalizations and lower medical bills. Recent research has quantified the costs and benefits of improving bicycle and pedestrian facilities and finds that benefits far outweigh costs.

A 2010 study that focused on one Wisconsin county estimated that the cost of making sidewalks available to everyone in the county (ensuring sidewalks on at least one side of all streets) would cost \$450 million, but would yield benefits to residents in terms of health and improved air quality over a ten-year period on the order of \$800 million, for a cost-benefit ratio of 1.7. (Guo & Gandavarapu, 2010)

A 2008 study that compiled the results of 16 research projects found that, while the cost-benefit ratios identified in these papers vary widely, the average cost-benefit ratio for bike and pedestrian improvements was 1:5. In the studies reviewed, benefits were primarily health related (quantified in terms of hospitalization, absenteeism, etc.), but also included reduced risk of accidents, reduced congestion and improved air quality. (Cavill, Kahlmeier, & Rutter, 2008)

5.2. More Information

Health & Social Benefits

Recommended Community Strategies and Measurements to Prevent Obesity in the United States, Centers for Disease Control

http://www.cdc.gov/obesity/downloads/community_strategies_guide.pdf

“How much physical activity do adults need?”, Centers for Disease Control and Prevention webpage

<http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html>

The Association between Urban Form and Physical Activity in US Adults

[http://www.ajpmonline.org/article/S0749-3797\(02\)00476-2/fulltext](http://www.ajpmonline.org/article/S0749-3797(02)00476-2/fulltext)

Correlates of Walking for Transportation or Recreation Purposes

http://www.activelivingresearch.org/files/JPAH_6_Lee_0.pdf

Destinations that matter: associations with walking for transport

http://www.ipenproject.org/documents/publications_docs/CERIN%20destinations_H&P.pdf

Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings from SMARTRAQ

<http://www.ncbi.nlm.nih.gov/pubmed/15694519>

Operational Definitions of Walkable Neighborhood: Theoretical and Empirical Insights

http://activelivingresearch.com/files/JPAH_7_Moudon.pdf

Social Capital and the Built Environment: The Importance of Walkable Neighborhoods, *American Journal of Public Health*

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1448008/pdf/0931546.pdf>

“What's the single best exercise?”, *New York Times Magazine*

http://www.nytimes.com/2011/04/17/magazine/mag-17exercise-t.html?pagewanted=all&_r=0

Safety Benefits

Aging Americans: Stranded without Options, Surface Transportation Policy Project

<http://www.transact.org/report.asp?id=232>

PEDSAFE, Pedestrian Safety Guide and Countermeasure Selection System, FHWA

Comprehensive online source for pedestrian safety planning and design

<http://www.pedbikesafe.org/PEDSAFE/>

A Guide for Reducing Collisions Involving Pedestrians, National Cooperative Highway Research Program Report 500

Data and analysis on accidents, as well as a catalog of safety improvements and steps to

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implementation.

<http://safety.transportation.org/guides.aspx?cid=29>

Dangerous by Design, Transportation for America

This resource focuses primarily on data that indicate dangerous roadways in America.

<http://www.transact.org/PDFs/2009-11-09-Dangerous%20by%20Design.pdf>

How to Develop a Pedestrian Safety Action Plan, FHWA, NHTSA, Pedestrian and Bicycle Information Center

Summary of steps to take in coming up with a pedestrian plan focused on safety. Appendix B is an excellent resource on conducting pedestrian counts. Appendix D lists funding sources.

http://safety.fhwa.dot.gov/ped_bike/ped_focus/docs/fhwasa0512.pdf

A Review of Pedestrian Safety Research in the United States and Abroad, FHWA

Review of research and analysis of how, where and why vehicle-pedestrian collisions occur and which measures are most effective at eliminating or reducing collisions.

<http://www.fhwa.dot.gov/publications/research/safety/pedbike/03042/>

Pedestrian and Bicycle Collisions in Onondaga County, Tri-State Transportation Campaign

This is not the source of the collision data in this report, but this is a good source for information on collisions between vehicles and non-vehicles in New York State.

[http://org2.salsalabs.com/dia/track.jsp?key=-](http://org2.salsalabs.com/dia/track.jsp?key=-1&url_num=1&url=http%3A%2F%2Ftstc.org%2Freports%2Ffactsheets%2FOnondaga_2013.pdf)

[1&url_num=1&url=http%3A%2F%2Ftstc.org%2Freports%2Ffactsheets%2FOnondaga_2013.pdf](http://org2.salsalabs.com/dia/track.jsp?key=-1&url_num=1&url=http%3A%2F%2Ftstc.org%2Freports%2Ffactsheets%2FOnondaga_2013.pdf)

Journey to School

Safe Routes to School: Helping Communities Save Lives and Dollars, Safe Routes to School National Partnership 2011 Policy Report

<http://www.saferoutespartnership.org/sites/default/files/pdf/SRTSNP-2011-Policy-Report.pdf>

Developing a Walking School Bus

<http://www.walkingschoolbus.org/>

Better Targeting New York's Pupil Transportation Aid, Citizens Budget Commission

Provides background information on the costs of busing students to and from school in New York State.

http://www.cbcny.org/sites/default/files/REPORT_SchoolTransport_12122012.pdf

Safe Routes to School Travel Data, National Center for Safe Routes to School

http://www.sacog.org/complete-streets/toolkit/files/docs/NCSRTS_SRTS%20Travel%20Data.pdf

Pupil Transportation Policy, New York State Department of Education

http://www.p12.nysed.gov/schoolbus/Parents/htm/general_info_intro.htm

Calculating School Transportation Reimbursement

<https://stateaid.nysed.gov/trans/calculated.htm>

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Child Safety Zone Regulations, New York State Department of Education
http://www.p12.nysed.gov/schoolbus/BusinessOfficial/htm/Part_191.html#p191.8

Economic Benefits

Making the Case for Investment in the Walking Environment, Living Streets
<http://www.livingstreets.org.uk/professionals/making-the-case-for-investment-in-the-walking-environment>

“Economic analyses of transport infrastructure and policies including health effects related to cycling and walking: a systematic review”, *Transport Policy*
http://www.euro.who.int/_data/assets/pdf_file/0010/53857/E92660.pdf

Walking the Walk: How Walkability Raises Housing Values in US Cities, Joe Cortright and CEOs for Cities
http://www.ceosforcities.org/pagefiles/WalkingTheWalk_CEOsforCities.pdf

“An economic evaluation of health-promotive built environment changes” (the Wisconsin sidewalk study), *Preventive Medicine*
<http://www.ncbi.nlm.nih.gov/pubmed/19840817>

“The Walkability Premium in Commercial Real Estate Investments”, *Real Estate Economics*
http://cala.arizona.edu/sites/default/files/faculty_papers/The%20Walkability%20Premium%20in%20Commercial%20Real%20Estate%20Investments,%202011.pdf